

Examples of Offshore Renewable Energy



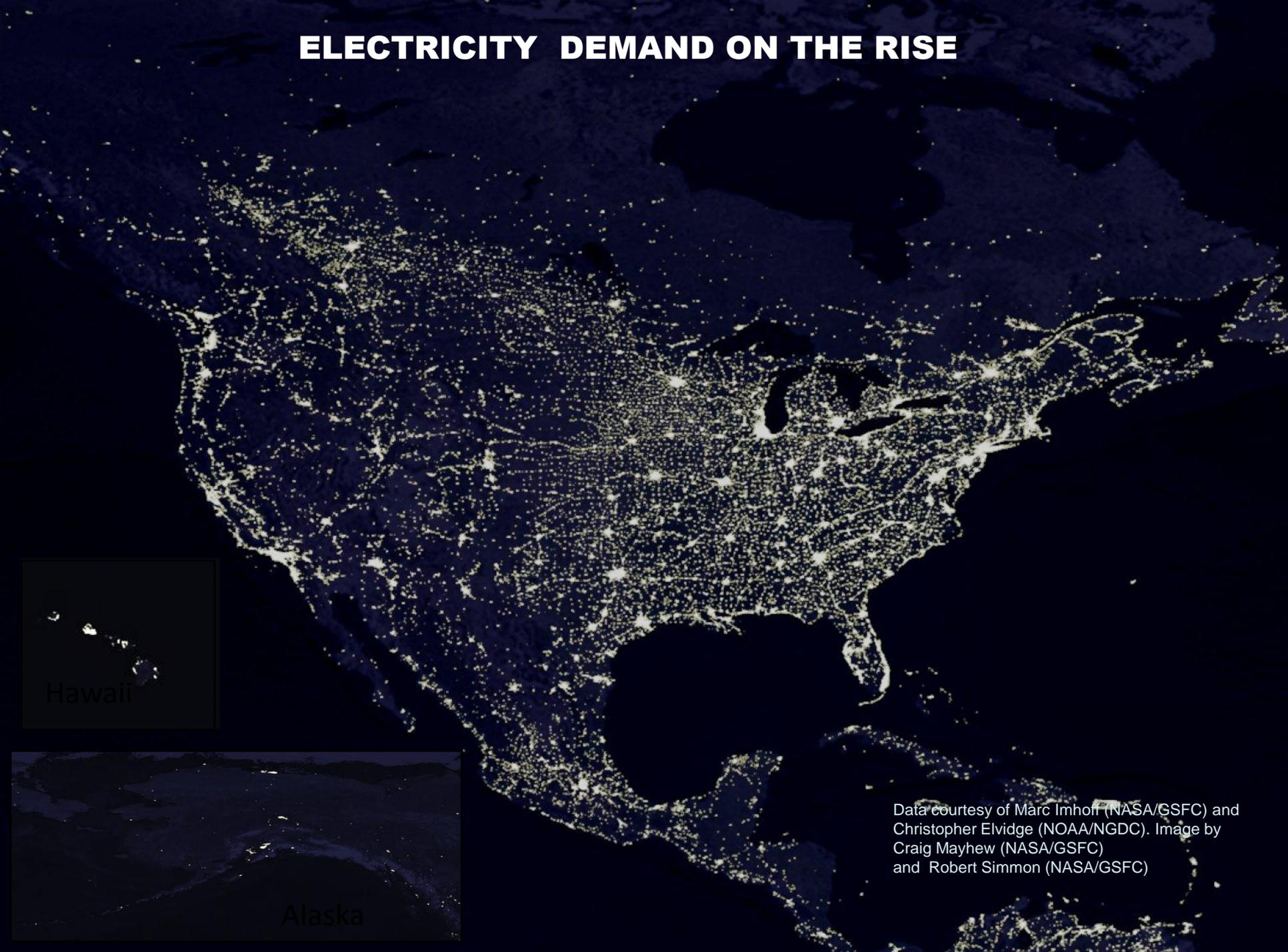
Wind Energy

Wave Energy

Ocean Current
Energy



ELECTRICITY DEMAND ON THE RISE

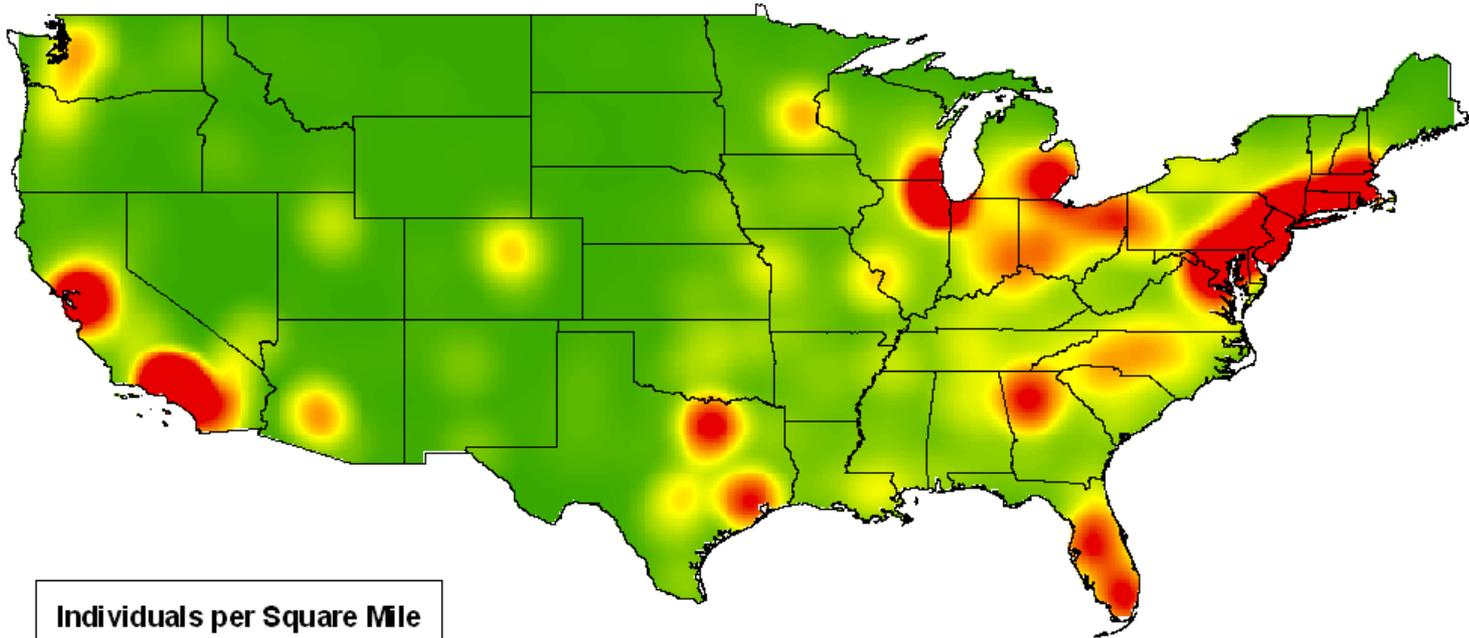


Hawaii

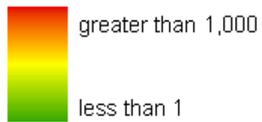
Alaska

Data courtesy of Marc Imhoff (NASA/GSFC) and
Christopher Elvidge (NOAA/NGDC). Image by
Craig Mayhew (NASA/GSFC)
and Robert Simmon (NASA/GSFC)

Population Density of the Contiguous United States



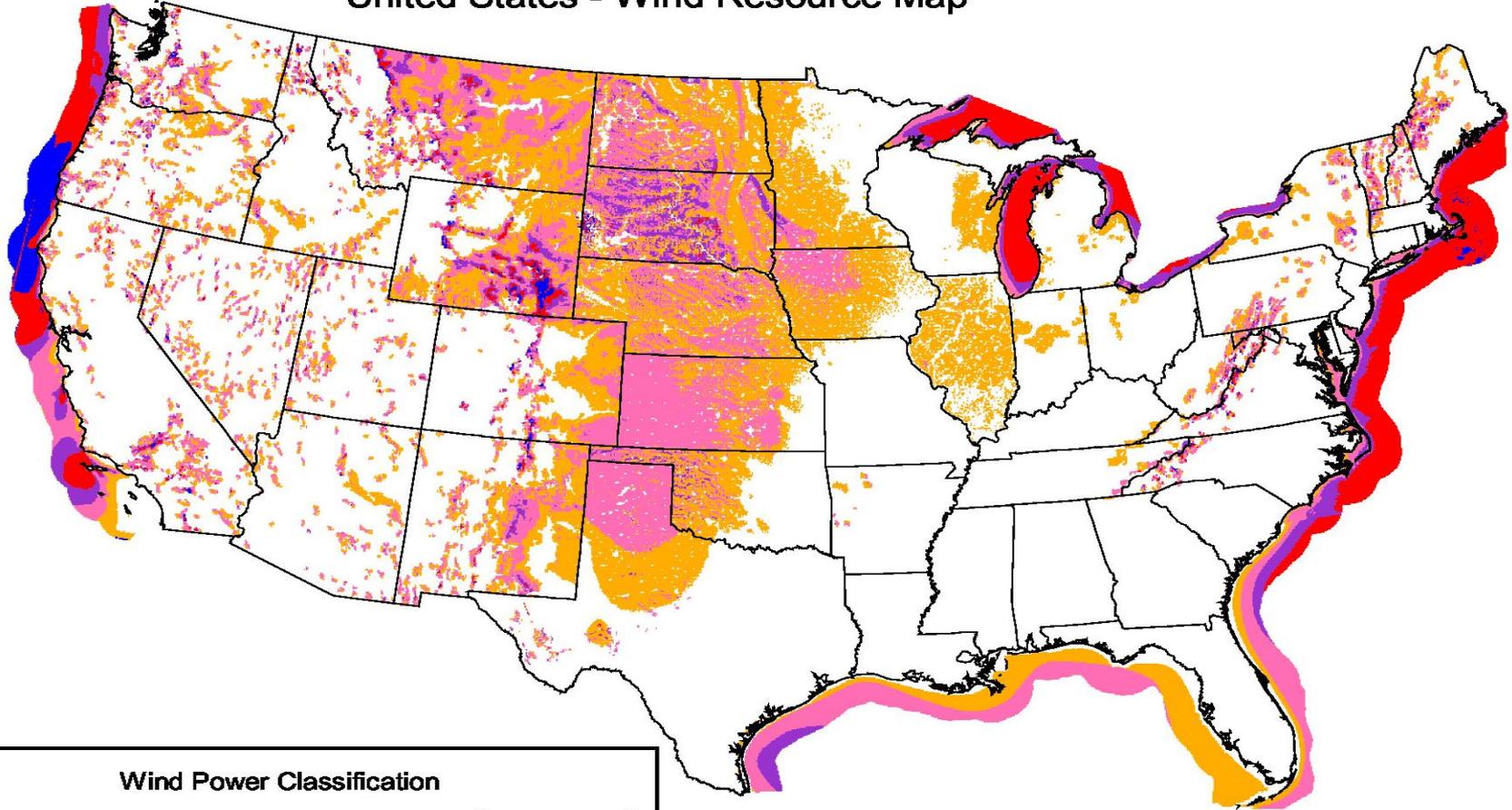
Individuals per Square Mile



U.S. Wind Speed Data

Substantial Offshore Resources Located Near Coastal Areas

United States - Wind Resource Map



Wind Power Classification

Wind Power Class	Resource Potential	Wind Power Density at 50 m W/m^2	Wind Speed ^a at 50 m m/s	Wind Speed ^a at 50 m mph
3	Fair	300 - 400	6.4 - 7.0	14.3 - 15.7
4	Good	400 - 500	7.0 - 7.5	15.7 - 16.8
5	Excellent	500 - 600	7.5 - 8.0	16.8 - 17.9
6	Outstanding	600 - 800	8.0 - 8.8	17.9 - 19.7
7	Superb	800 - 1600	8.8 - 11.1	19.7 - 24.8

^aWind speeds are based on a Weibull k value of 2.0

What About Watts?

- Household power is measured in KW (kilowatts)
- 1,000 KW = 1 MW (megawatt)
- 1,000 MW = 1 GW (gigawatt)
- A mid-size coal-fired electrical plant produces ~350 MW; so 1 GW = output from 3 typical coal plants

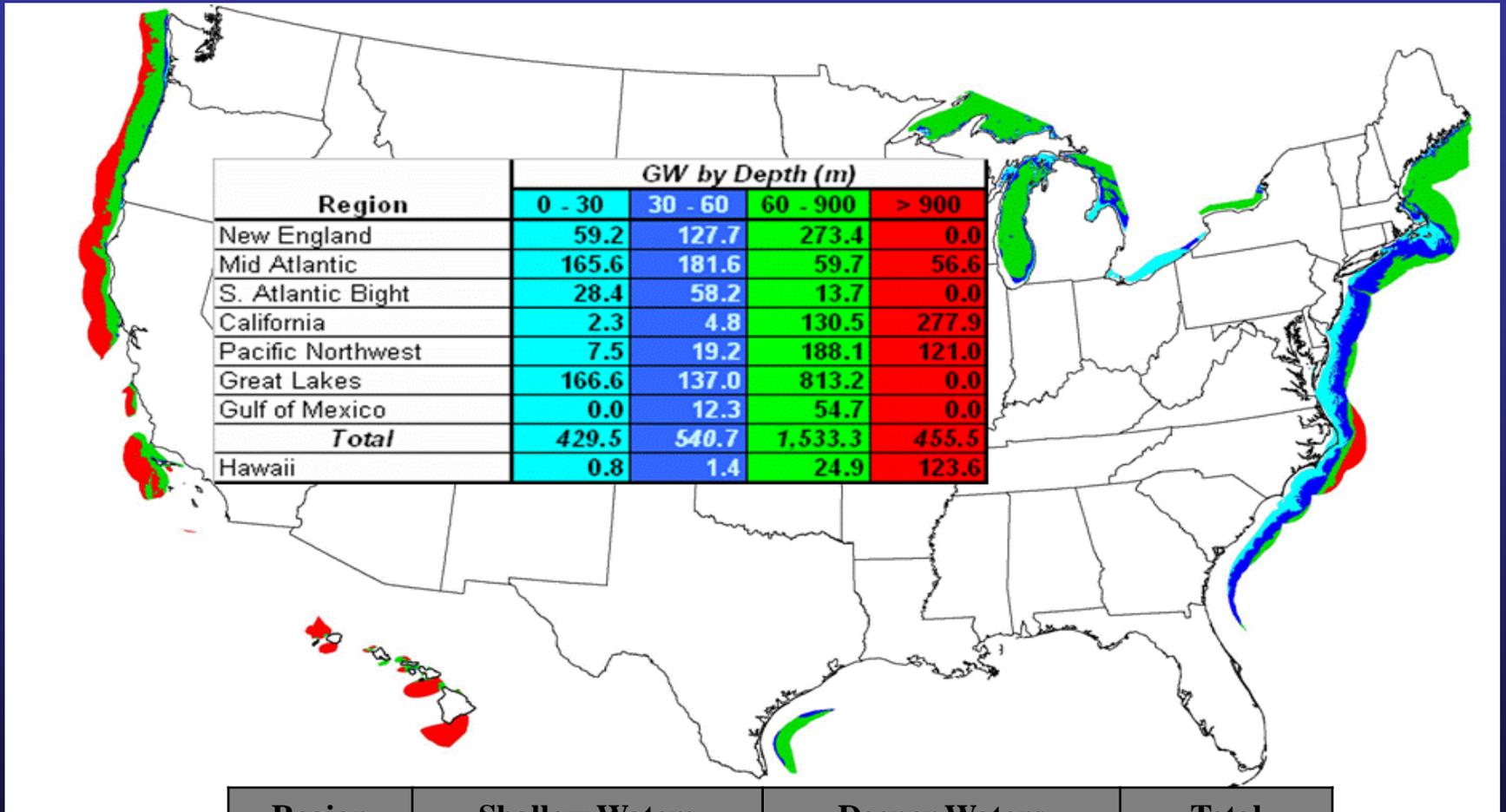


Energy Consumption

- The average American household uses about 10,655 kilowatt-hours per year (kWh/y)
- 1 GW of wind power will supply between 225,000 to 300,000 average U.S. homes with power annually.

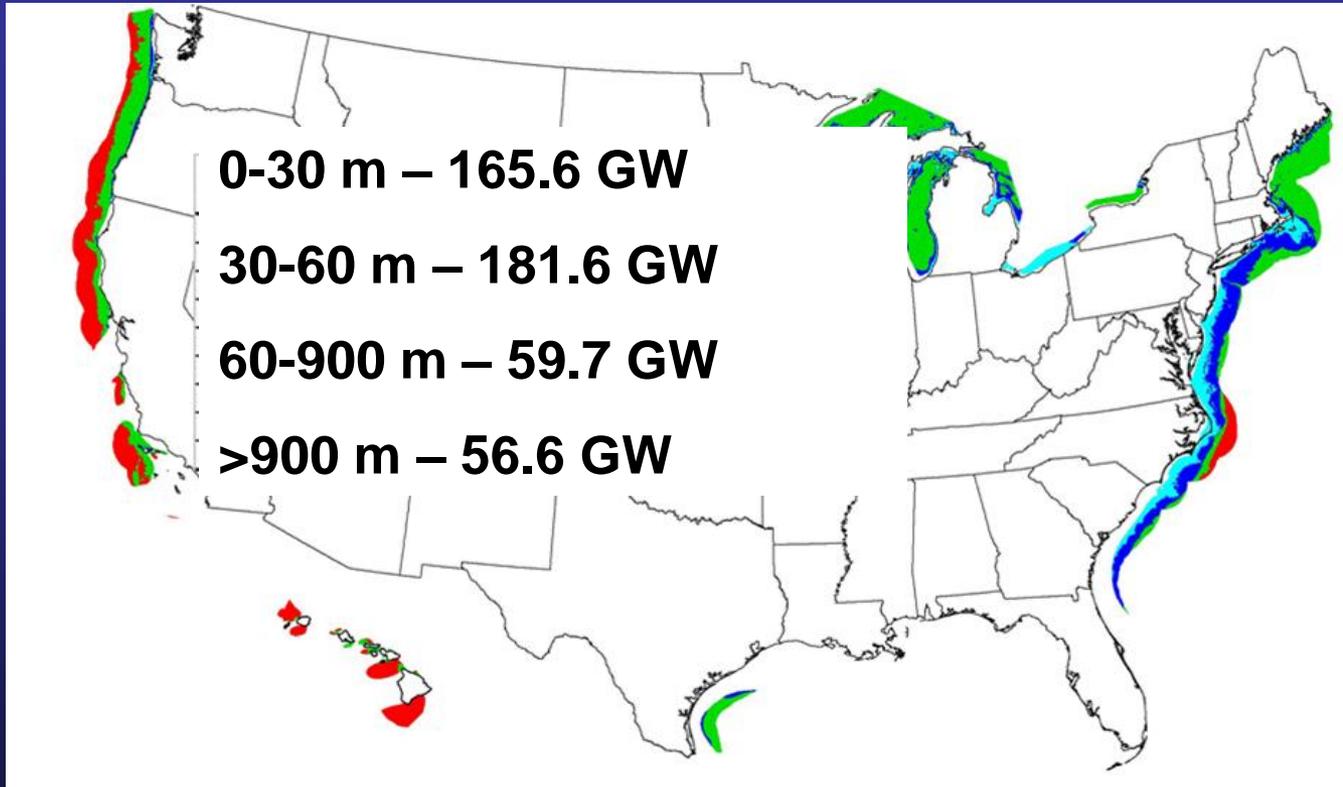


Regional Offshore Wind Energy Potential Capacity



Region	Shallow Waters	Deeper Waters	Total
Atlantic	253.2 GW	770.9 GW	1024 GW
Pacific	10.6 GW	891.4 GW	902 GW
Gulf	0 GW	67 GW	67 GW

Mid-Atlantic Resource



NREL

NREL estimates a gross resource of 463 GW. Assuming about 40%—**185 GW** (1,257 TWh/y)—could be developed, that would power about **53.3 million average U.S. homes.**

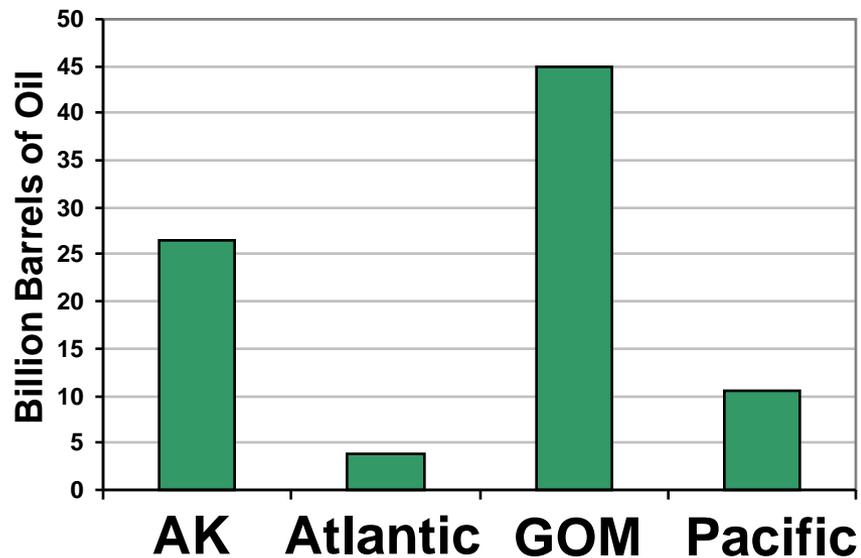
Oil and Gas Resources

After more than 50 years of exploration and development, 70% of total resources are yet to be discovered.

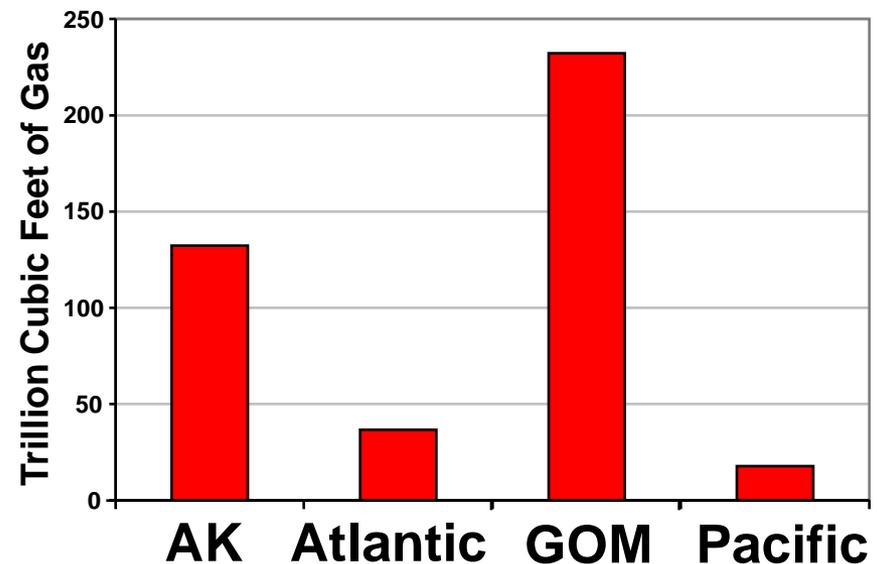


Undiscovered Technically Recoverable Oil and Gas Resources 2006 National Assessment Results

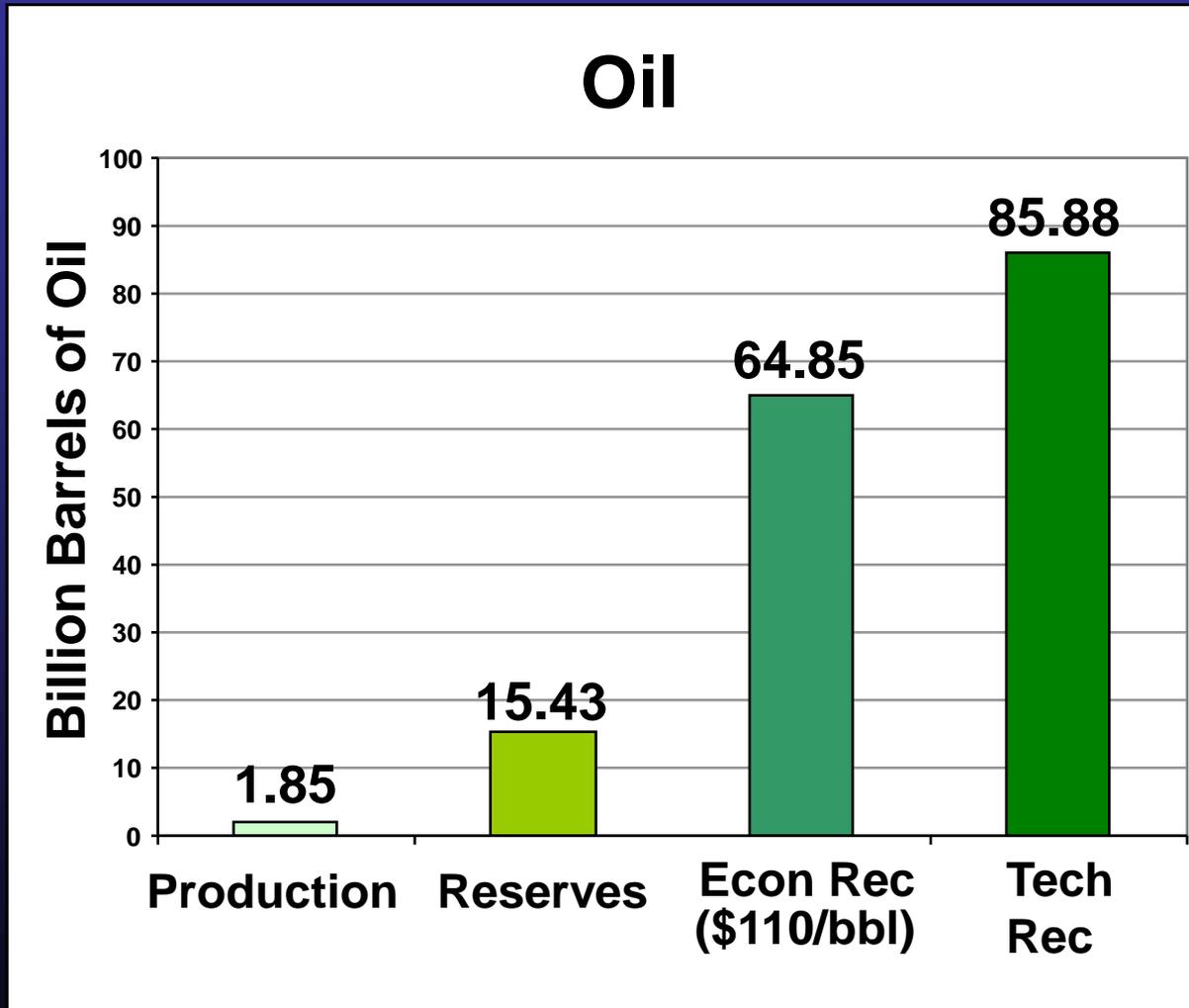
OCS Oil



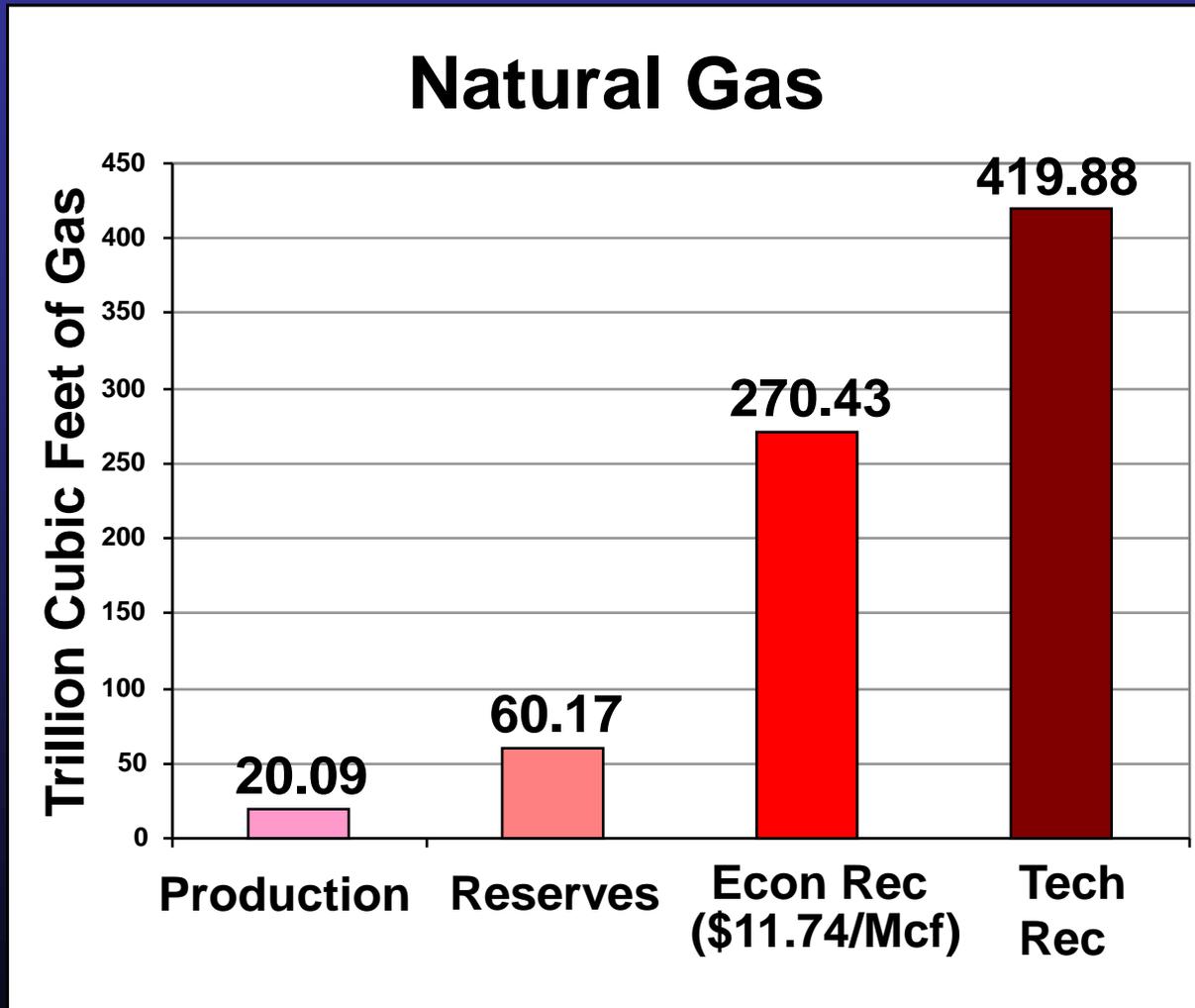
OCS Gas



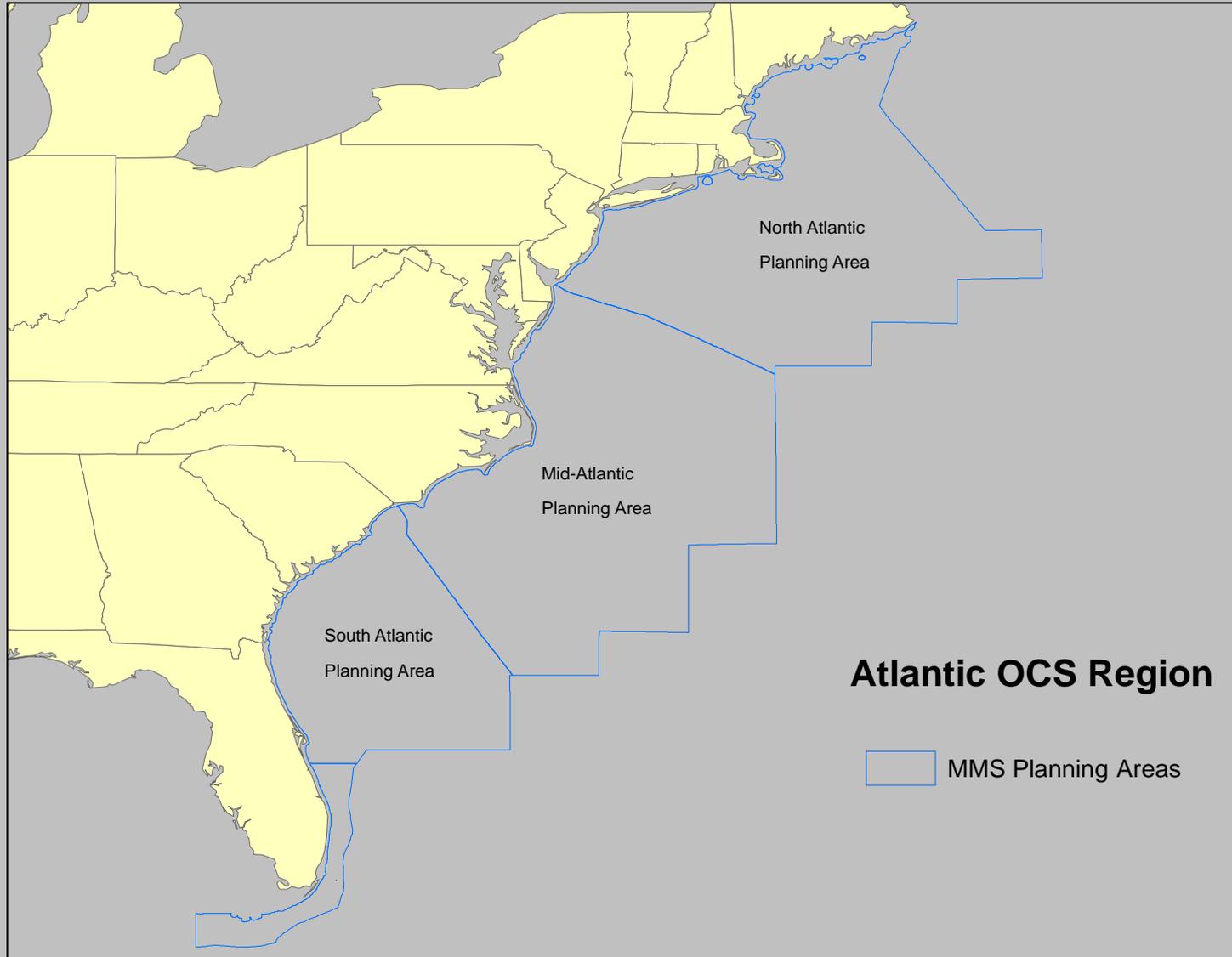
U.S. Annual Oil Production, OCS Reserves, and Resources



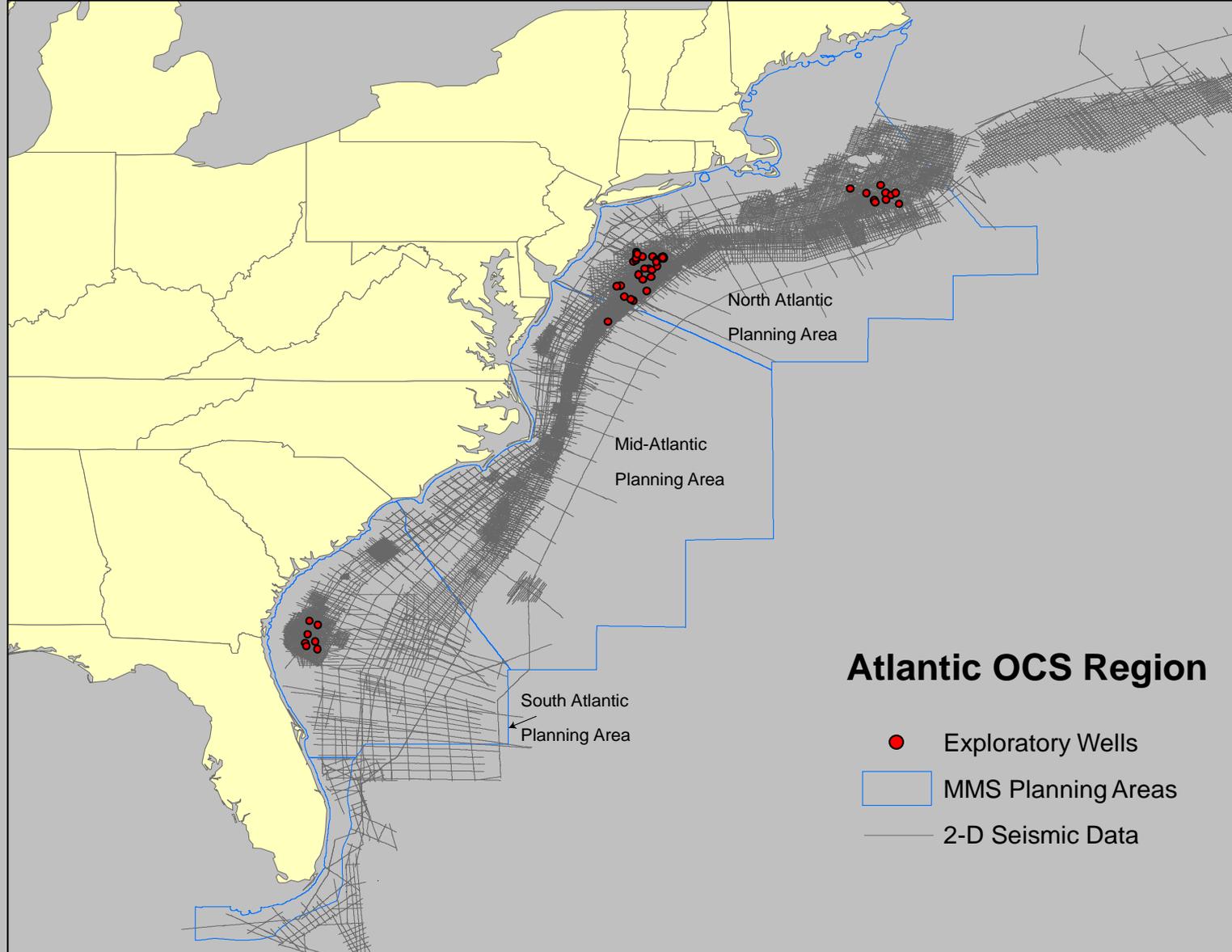
U.S. Annual Gas Production, OCS Reserves, and Resources



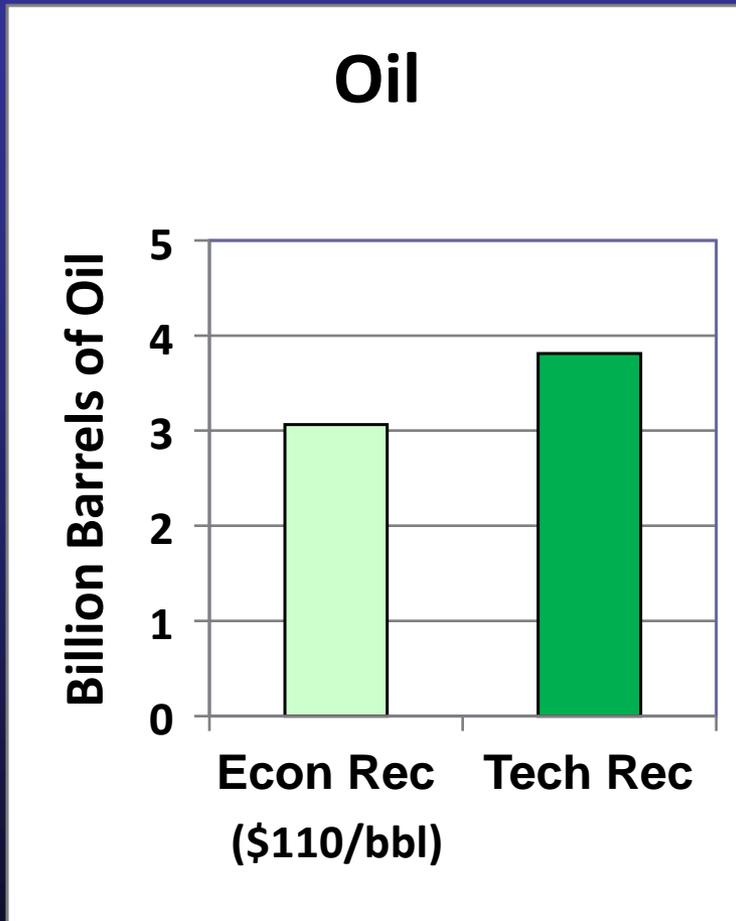
Atlantic OCS Area



Atlantic OCS Exploratory Wells and Seismic Data

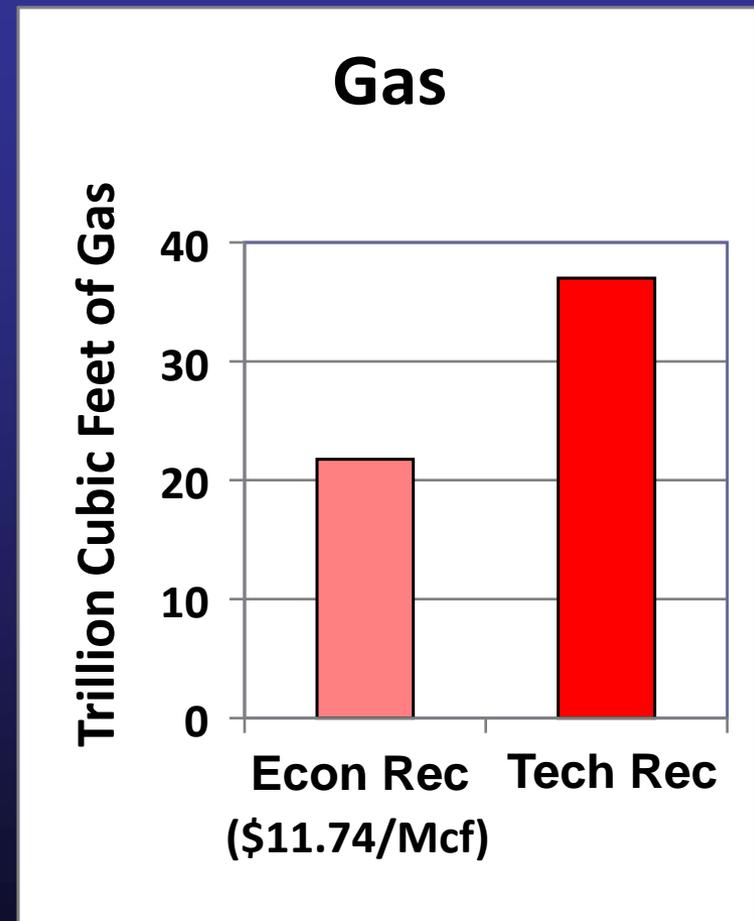


Atlantic OCS Area Undiscovered Oil and Gas Resources



Oil Resources:

1.1 – 7.6 billion barrels



Gas Resources:

14.3 – 66.5 trillion cubic feet

Atlantic OCS Oil and Gas Resource Data Gaps

- Seismic data are more than 25 years old.
- New seismic data needed for certain areas to better inform resource management.
- Current interest by seismic industry:
 - 5 companies submitted permit applications for seismic surveys,
 - 1 company submitted permit for an aeromagnetic survey.
- MMS has announced intent to prepare an Environmental Impact Statement on geological and geophysical activities in this region.

Key Environmental Issues

Stewardship

Our Overriding Consideration

BALANCING:

- the Nation's energy needs
- Environmental sensitivity and marine productivity
- Multiple use of the sea and seabed

The Challenge of Climate Change

Forecasting, planning for and mitigating:

- **Long-term Ecosystem Changes**
 - (and effects on species and habitats)
- **Changes in Renewable Energy Resources**
 - e.g. Wind and Wave frequency, persistence, etc.
- **Changes in Environmental Conditions and Impacts to Energy Infrastructure**
 - (storms, sea level, wave heights, etc.)

Atlantic Coast and Offshore Key Challenges & Information Gaps

- **Noise in the Sea - effects of noise on marine species**
- **Lack of Existing Onshore Infrastructure to support development**
- **Bird Interactions: Baselines & Migration Patterns**
- **Fisheries; Multiple-use of OCS; Tourism**

